

Nomenclatural revision of the syntaxa of European coastal dune vegetation

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Abstract

This manuscript provides a review of the phytosociological nomenclature of the European syntaxa included in the classes *Ammophiletea arundinaceae*, *Honckenyo peploidis-Elymetea arenarii*, and *Koelerio glaucae-Corynephoretea canescens*. The nomenclature has been refined and updated following the 4th edition of the International Code of Phytosociological Nomenclature (ICPN). In the Appendix, we submit two proposals (37, 38) to conserve the names *Ammophilion arundinaceae* Braun-Blanquet 1933 and *Medicagini marinae-Ammophiletum arundinaceae* Braun-Blanquet 1933.

Taxonomic reference: see references in the main text.

Syntaxonomic reference: see references in the main text.

Abbreviations: EVCC = European Vegetation Classification Committee; ICPN = 4th edition of the International Code of Phytosociological Nomenclature (Theurillat et al. 2021).

Keywords

coastal dune, Europe, nomenclature, *nomen conservandum*, plant community, syntaxonomy, vegetation

Introduction

A revision of the classification of shifting and stable coastal dune vegetation in Europe and the Mediterranean Basin was published by Marcenò et al. (2018). That study proposed several syntaxonomic changes to the classification accepted in EuroVegChecklist (Mucina et al. 2016). However, the authors maintained the same nomenclature as Mucina et al. (2016) to avoid confusion, since EuroVegChecklist is the main reference for European vegetation scientists.

In October 2019, a proposal to change the EuroVeg-Checklist classification of the classes *Ammophiletea*, *Helichryso-Crucianelletea maritimae* and *Koelerio-Corynephoretea canescens* was submitted to the European Vegetation Classification Committee (EVCC), a body established by the Working Group European Vegetation Survey of the International Association for Vegetation Science (<http://euroveg.org/evc-committee>). The proposal was evaluated according to the EVCC procedures (<http://euroveg.org/evc-committee>) and eventually approved (Biurrun and Willner 2020). Before updating the new syntaxonomic treat-

ment of coastal-dune vegetation on the European vegetation classification website (<https://floraveg.eu/vegetation/>), this article reviews the phytosociological nomenclature of syntaxa included in the classes *Ammophiletea arundinaceae*, *Honckenyo peploidis-Elymetea arenarii* and *Koelerio glaucae-Corynepherea canescentis* following the 4th edition of the International Code of Phytosociological Nomenclature (ICPN; Theurillat et al. 2021). Two proposals for *nomina conservanda* (Art. 52) are reported in Appendix 1.

Methods

Syntaxon names were revised after reviewing the original diagnoses and descriptions in the original publications. The name-giving taxa (usually species) were checked and, where necessary, replaced with correct names (*nomina correcta*; Art. 44) or names in current use (*nomina mutata*; Art. 45), taking into account the taxonomic concepts and nomenclature of the most relevant recent floras and checklists (Castroviejo et al. 1986–2021; Tison et al. 2014; Pignatti et al. 2017–2019; Euro+Med 2023). To ensure the long-term stability of the nomenclature, we opted for the taxonomies that are most widely accepted in current floras. In particular, this applied to generic concepts of species classified in different genera. It should be noted, however, that authors are free to use either the original (and corrected if necessary) or the mutated name since *nomina mutata* are alternative forms of the name that can be used instead of the correct name (Art. 22). In contrast, *nomina correcta* are obligatory.

The information for each syntaxon contains the synonyms, the original form of the syntaxon name, the name-giving taxa for both the original and modified syntaxon names and the nomenclatural *typus*. Since the choice of the correct taxon name is based on the priority principle (Turland et al. 2018), we provide the date of publication of each taxon name to make our nomenclature solution more understandable. We have also added a brief commentary on the proposed changes when necessary. Appendix 2 contains the syntaxonomic framework in which all syntaxa considered in this paper are listed. This manuscript also contains syntaxa that have no nomenclatural issues and have been officially accepted in the EuroVegChecklist. The inclusion of these syntaxa aims to offer readers a comprehensive context and reaffirm their validity.

Results

We adopt the following names for the syntaxa of European coastal dune vegetation:

Ammophiletea arundinaceae Braun-Blanquet et Tüxen ex Westhoff et al. 1946

Original form of the name (Westhoff et al. 1946: 46): “*Ammophiletea* Br.-Bl. et Tx. 1943 n. n.”

Name-giving taxon: *Ammophila arenaria* subsp. *arundinacea* (Husn.) H. Lindb. 1932

Typus: *Ammophiletalia* Braun-Blanquet 1933 (*holotypus*)

Although Westhoff et al. (1946) list associations of the temperate European Atlantic coast with *Ammophila arenaria* subsp. *arenaria*, these associations are not relevant for determining the name-giving taxon of the class. The sole relevant aspect of the original diagnosis of the class is the inclusion of the single order *Ammophiletalia* Braun-Blanquet 1933 with an unambiguous reference. In the tables of Braun-Blanquet (1933), only *Ammophila arenaria* subsp. *arundinacea* is listed (see below).

Ammophiletalia arundinaceae Braun-Blanquet 1933

Original form of the name (Braun-Blanquet 1933: 5): “*Ammophiletalia* Br.-Bl. (1921) 1933”

Name-giving taxon: *Ammophila arenaria* subsp. *arundinacea* (Husn.) H. Lindb. 1932 [Note: Braun-Blanquet (1933) used the incorrect author name “(Host)” for this subspecies, but this does not affect the syntaxonomic nomenclature since the subspecies had been validly published in 1932]

Typus: *Ammophilion arundinaceae* Braun-Blanquet 1933 (*holotypus*)

Mucina et al. (2016) considered *Ammophiletalia* Braun-Blanquet et Tüxen ex Westhoff et al. 1946 to be the correct name of this order. However, the order was already validly described by Braun-Blanquet (1933), who dealt with Mediterranean vegetation. The year 1921 in brackets after the order name probably refers to Braun-Blanquet (1921). However, no order is mentioned in Braun-Blanquet (1921), only the alliance “*Ammophilion*”. The original diagnosis of the order contains a single valid alliance, the “*Ammophilion* Br.-Bl. (1921) 1933” [recte: *Ammophilion arundinaceae* Braun-Blanquet 1933], which is therefore the holotype of the order. There is a second alliance “*Ononidion angustissimae* Br.-Bl. prov.”, but it is not validly published (Art. 3b, 8), therefore irrelevant from the nomenclatural point of view. The original diagnosis of the *Ammophilion* contains three associations that are validly described with synoptic tables. Since only *Ammophila arenaria* subsp. *arundinacea* is listed in the tables, this is the name-giving taxon of the order and the alliance.

Ammophilion arundinaceae Braun-Blanquet 1933 *nom. cons. propos.*

Original form of the name (Braun-Blanquet 1933: 5): “*Ammophilion* Br.-Bl. (1921) 1933”

Name-giving taxon: *Ammophila arenaria* subsp. *arundinacea* (Husn.) H. Lindb. 1932 [Note: Braun-Blanquet (1933) used the incorrect author name “(Host)” for this subspecies, but this has no effect on the syntaxonomic nomenclature]

Typus: *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921 *nom. invers.* (*holotypus*)

Synonym: *Ammophilion arenariae* Braun-Blanquet 1921 (correct name according to the ICPN).

The nomenclature of this alliance is discussed in Appendix 1.

***Medicagini marinae-Ammophiletum arundinaceae* Braun-Blanquet 1933 nom. invers. et nom. cons. propos.**

Original form of the name (Braun-Blanquet 1933: 8): “Ass. à *Ammophila arundinacea* et *Medicago marina* Br.-Bl. (1921) 1933”

Name-giving taxa: *Medicago marina* L. 1753, *Ammophila arenaria* subsp. *arundinacea* (Husn.) H. Lindb. 1932 [Note: Braun-Blanquet (1933) used the incorrect author name “(Host)” for this subspecies, but this has no effect on the syntaxonomic nomenclature]

Typus: Braun-Blanquet (1921), relevé no. 2, p. 344 (Art. 18b, *lectotypus* selected by Fernández Prieto and Díaz González 1991 for the *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921)

Synonyms: *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921 nom. invers. (correct name according to the ICPN), *Medicagini marinae-Ammophiletum australis* Braun-Blanquet 1921 nom. invers. et mut. Fernández Prieto et Díaz González 1991 nom. inept.

The nomenclature of this association is discussed in Appendix 1.

***Crucianelletalia maritimae* Sissingh 1974**

Original form of the name (Sissingh 1974: 103): “*Crucianelletalia maritimae* ordo novo [recte: ordo novus]”

Name-giving taxon: *Crucianella maritima* L. 1753

Typus: *Crucianellion maritimae* Rivas Goday et Rivas-Martínez 1958 (automatic type, Art. 20)

***Ononidion ramosissimae* Pignatti 1953**

Original form of the name (Pignatti 1952: 322): “*Ononidion ramosissimae* Pign. 1953”

Name-giving taxon: *Ononis ramosissima* Desf. 1798

Typus: *Crucianelletum maritimae* Braun-Blanquet 1933: p. 9 (*lectotypus hoc loco*)

Synonym: *Crucianellion maritimae* Rivas Goday et Rivas-Martínez 1958

This syntaxon name was considered invalid by various authors. Rivas-Martínez et al. (2001, 2011) considered it a *nomen dubium* (Art. 38) without further explanation. However, Pignatti (1952, 1953) included the validly published association “*Crucianelletum maritimae* Br. Bl. (1921) 1933” [recte: *Crucianelletum maritimae* Braun-Blanquet 1933] in this alliance, providing a sufficient bibliographical reference in the last part of his work. Interestingly, the same association was reported as the holotype of the *Crucianellion maritimae* by Rivas Goday and Rivas-Martínez (1958). Mucina et al. (2016) also considered the name *Ononidion ramosissimae* as invalid (according to Art. 2b), probably because the bibliographical reference to Braun-Blanquet (1933) is not in the same part of the study as the description of the alliance (but see Art. 1, Note 2). Consequently, the *Ononidion ramosissimae* was validly described by Pignatti (1952, 1953) and it has priority over the *Crucianellion maritimae* Rivas Goday et Rivas-Martínez 1958, which is a later homotypic synonym.

***Diantho attenuati-Scrophularion caninae* Baudière et Simonneau 1974 nom. corr. et mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Baudière and Simonneau 1974: 39): “*Diantho-Scrophularion humifusae*”

Name-giving taxa of the original syntaxon name: *Dianthus pyrenaicus* subsp. *catalaunicus* (Willk. et Costa 1860) Tutin 1963, *Scrophularia humifusa* Timb.-Lagr. et Gaut. 1875

Name-giving taxa of the corrected and mutated syntaxon name: *Dianthus pyrenaicus* subsp. *attenuatus* (Sm. 1794) M. Bernal et al. 1988, *Scrophularia canina* L. 1753

Authoritative taxonomic treatments that use the name *Scrophularia canina*: Castroviejo et al. (1986–2021), Euro+Med (2023)

Typus: *Diantho attenuati-Corynephorum canescentis* Baudière et Simonneau 1974 (*holotypus*)

Synonyms: *Diantho catalaunici-Scrophularion humifusae* Baudière et Simonneau ex Géhu et Bournique 1992

As noticed by Bernal (1988), Nyman (1878–1882) formally established the autonym *Dianthus attenuatus* Sm. subsp. *attenuatus* when he combined *D. attenuatus* subsp. *benearnensis* (Loret) Nyman. Hence, the epithet *attenuatus* has nomenclatural priority over *catalaunicus* at the subspecies rank. This implies a correction according to Art. 44 of the alliance name and the association name reported below.

Scrophularia humifusa Timb.-Lagr. et Gaut. is considered as a synonym of *S. canina* L. in the current taxonomic literature. Therefore, we propose a mutation of the association name. Castroviejo et al. (1986–2021) include *Scrophularia canina* var. *humifusa* (Timb.-Lagr. et Gaut.) Gaut. 1897 into the synonymy of *S. canina* subsp. *canina* and consider it as an invalid name (*nomen nudum*). However, it was published as a new combination with an indirect reference to the validly published name *S. humifusa* Timb.-Lagr. et Gaut., which renders the variety name validly published.

***Diantho attenuati-Corynephorum canescentis* Baudière et Simonneau 1974 nom. corr.**

Original form of the name (Baudière and Simonneau 1974): “*Diantho-Corynephorum*”

Name-giving taxa of the original syntaxon name: *Dianthus pyrenaicus* subsp. *catalaunicus* (Willk. et Costa) Tutin 1963, *Corynephorus canescens* (L.) P. Beauv. 1812

Name-giving taxa of the corrected syntaxon name: *Dianthus pyrenaicus* subsp. *attenuatus* (Sm. 1794) M. Bernal et al. 1988, *Corynephorus canescens* (L.) P. Beauv. 1812

Typus: Baudière and Simonneau (1974), table II, relevé no. 19, p. 28 (*lectotypus hoc loco*)

Géhu and Bournique (1992) considered this syntaxon name and the corresponding alliance invalid (Art. 2b, *nom. nud.*). Baudière and Simonneau (1974) described two new associations: *Cladonio-Ephedretum*, referring to table 5: 34, ‘groupements à Ephedra’, and *Diantho-Corynephorum*, referring to tables 2: 28 and 3: 30, ‘groupements à *Corynephorus canescens*’. However, the *Cladonio-Ephedretum* is an invalid name because there are no *Cladonia* species in the relevés of table 5 (Art. 3f) - lichen species are only cited in

the text. Therefore, the *Diantho-Corynephorum* [recte: *Diantho attenuati-Corynephorum canescentis*] is a valid name because both table 2 and table 3 contain relevés with *Corynephorus canescens* and *Dianthus catalaunicus*, including the name-giving taxon of the alliance '*Scrophularia canina* var. *humifusa* (Timb-Lag.) Gaut'. This suggests the validity of the two syntaxa described by Baudière and Simonneau (1974).

***Helichryso barrelieri-Centaureion spinosae* Mucina et Dimopoulos in Mucina et al. 2016**

Original form of the name (Mucina et al. 2016: 142): "*Helichryso barrelieri-Centaureion spinosae* Mucina et Dimopoulos all. nov."

Name-giving taxa: *Helichrysum stoechas* subsp. *barrelieri* (Ten.) Nyman 1879, *Centaurea spinosa* L. 1753

Typus: *Thymbro capitatae-Centaureetum spinosae* Géhu 1992 nom. illeg. (holotypus)

The type chosen by Mucina and Dimopoulos is an illegitimate name (see Art. 43, Example 1). The correct name of the association is *Medicagini marinae-Centaureetum spinosae* (see below). However, this does not affect the legitimacy of the alliance name (Art. 17, Note 1).

***Medicagini marinae-Centaureetum spinosae* Géhu in Géhu et al. 1988 corr. Marcenò et al. nom. corr. nov.**

Original form of the name (Géhu et al. 1988: 99): "*Medicagini marinae-Stachyetum spinosae*"

Name-giving taxa of the original syntaxon name: *Medicago marina* L., *Stachys spinosa* L.

Name-giving taxa of the corrected syntaxon name: *Medicago marina* L., *Centaurea spinosa* L.

Typus: Géhu et al. (1992), table 2, relevé no. 8 (holotypus)

Synonym: *Thymbro capitatae-Centaureetum spinosae* Géhu 1992 nom. illeg. (Art. 29c)

The name *Medicagini marinae-Stachyetum spinosae* published in Géhu et al. (1988) is a *nomen ineptum* because the authors confused the name-giving taxa *Centaurea spinosa* L. and *Stachys spinosa* L. (Géhu 1992; see also ICPN, Art. 43, Example 1). Géhu (1992) published the replacement name "*Timbro capitati-Centaureetum spinosae*", but according to the ICPN, the original name must be maintained and corrected (Art. 43). The replacement name is an illegitimate *nomen superfluum* (Art. 29c).

***Centaureo cuneifoliae-Verbascion pinnatifidi* Brullo in Marcenò et al. 2018**

Original form of the name (Marcenò et al. 2018): "*Centaureo cuneifoliae-Verbascion pinnatifidi* Brullo in Marcenò et al. 2018 all. nova"

Name-giving taxa: *Centaurea cuneifolia* Sm. 1813 (subsp. *cuneifolia*), *Verbascum pinnatifidum* Vahl 1791

Typus: *Sileno subconicae-Ephedretum distachyae* Oberdorfer 1952 (holotypus)

***Helichryson picardii* (Rivas-Martínez, Costa et Izco in Rivas-Martínez et al. 1990) Rivas-Martínez et al. 1999**

Corresponding suballiance: *Helichrysenion picardii* Rivas-Martínez, Costa et Izco in Rivas-Martínez et al. 1990

Original form of the name (Rivas-Martínez et al. 1999):

"*Helichryson picardii* (Rivas-Martínez, Costa et Izco in Rivas-Martínez, Lousa, T. E. Díaz, Fernández-González et J. C. Costa 1990) *alliancia nova hoc loco*"

Name-giving taxon: *Helichrysum picardii* Boiss. et Reut. 1859

Typus: *Artemisio crithmifoliae-Armerietum pungentis* Rivas Goday et Rivas-Martínez 1958 (holotypus)

***Artemisio crithmifoliae-Armerietum pungentis* Rivas Goday et Rivas-Martínez 1958**

Original form of the name (Rivas Goday and Rivas-Martínez 1958): "*Artemisio crithmifoliae-Armerietum pungentis*"

Name-giving taxa: *Artemisia crithmifolia* L. 1753, *Armeria pungens* (Link) Hoffmanns. et Link 1813

Typus: Rivas Goday and Rivas-Martínez (1958), table 40, relevé no. 2 (*lectotypus* selected by Rivas-Martínez et al. 1990)

In Flora Iberica (Castroviejo et al. 1986–2021), *Artemisia crithmifolia* L. is accepted as a species, while in other taxonomic checklists, it is included in *A. campestris* subsp. *maritima* (DC.) Arcang. 1882 (e.g. Euro+Med 2023). However, a mutation of the name to "*Artemisio maritimae-Armerietum pungentis*" would be a source of confusion as there is also the accepted species name *A. maritima* L. 1753. Mutating the name to "*Artemisio campestris-Armerietum pungentis*" would be an option, but also a loss of information. Therefore, for the time being, we refrain from publishing a mutation of this association name.

***Leymetalia racemosi* Vicherek 1971 nom. corr. et mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Vicherek 1971: 135): "*Elymetalia gigantei* ordo nova [recte: ordo novus]"

Correct name: *Elymetalia racemosi* Vicherek 1971 nom. corr.

Name-giving taxon of the original syntaxon name: *Elymus giganteus* Vahl 1794

Name-giving taxon of the corrected and mutated syntaxon name: *Leymus racemosus* (Lam.) Tzvelev 1960 (≡ *Elymus racemosus* Lam. 1792)

Authoritative taxonomic treatments that use the name *Leymus racemosus*: Mosyakin and Fedoronchuk (1999), Euro+Med (2023)

Typus: *Elymion gigantei* Morariu 1957 (holotypus)

Synonyms: *Elymetalia gigantei* Vicherek 1971 nom. inept. (Art. 44)

The name *Elymetalia gigantei* Vicherek 1971 must be corrected to *Elymetalia racemosi* Vicherek 1971 nom. corr. because *Elymus giganteus* Vahl is a later taxonomic synonym of *E. racemosus* Lam. In addition to this correction, we propose a mutation to match the currently prevailing taxonomic approach that assigns *E. racemosus* to the genus *Leymus*. The same reasoning is applied to the alliance and association names listed below.

***Leymion racemosi* Morariu 1957 nom. corr. et mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Morariu 1957: 368): “*Elymion gigantei*”

Correct name: *Elymion racemosi* Morariu 1957 nom. corr.

Name-giving taxon of the original syntaxon name: *Elymus giganteus* Vahl 1794

Name-giving taxon of the corrected and mutated syntaxon name: *Leymus racemosus* (Lam.) Tzvelev 1960 (≡ *Elymus racemosus* Lam. 1792)

Authoritative taxonomic treatments that use the name *Leymus racemosus*: Mosyakin and Fedoronchuk (1999), Euro+Med (2023)

Typus: *Elymetum gigantei* Morariu 1957 (holotypus)

Synonyms: *Elymion gigantei* Morariu 1957 nom. inept. (Art. 44)

***Leymetum racemosi* Morariu 1957 nom. corr. et mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Morariu 1957: 369): “*Elymetum gigantei*”

Correct name: *Elymetum racemosi* Morariu 1957 nom. corr.

Name-giving taxon of the original syntaxon name: *Elymus giganteus* Vahl 1794

Name-giving taxa of the corrected and mutated syntaxon name: *Leymus racemosus* (Lam.) Tzvelev 1960 (≡ *Elymus racemosus* Lam. 1792)

Authoritative taxonomic treatments that use the name *Leymus racemosus*: Mosyakin and Fedoronchuk (1999), Euro+Med (2023)

Typus: Morariu (1957), relevé no. 3, p. 369 (lectotypus selected by Vicherek 1971)

Synonyms: *Elymetum gigantei* Morariu 1957 nom. inept. (Art. 44)

***Sileno thymifoliae-Jurineion kilaeae* Géhu et Uslu ex Mucina in Mucina et al. 2016**

Original form of the name (Mucina et al. 2016): “*Sileno thymifoliae-Jurineion kilaeae* Géhu et Uslu ex Mucina all. nov.”

Name-giving taxa: *Silene thymifolia* Sm. 1809, *Jurinea kilaea* Azn. 1897

Typus: *Stachyo subcrenatae-Centaureetum kilaeae* Géhu et Uslu 1989 (holotypus)

***Lomelosion ucranicae* Boscaiu 1975 mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Boscaiu 1975: 84): “*Scabiosion ucranicae*”

Name-giving taxon of the original syntaxon name: *Scabiosa ucranica* L. 1762

Name-giving taxon of the mutated syntaxon name: *Lomelosia ucranica* (L.) Soják 1987

Authoritative taxonomic treatments that use the name *Scabiosa ucranica*: Fedorov (1974), Czerepanov (1995), Mosyakin and Fedoronchuk (1999); for the segregate genus *Lomelosia*, see Castroviejo et al. (1986–2021), Euro+Med (2023)

Typus: *Carici colchicae-Ephedretum distachyae* Prodan ex Morariu 1959 (holotypus)

Synonym: *Scabiosion ucranicae* Boscaiu 1975

Although various floras and checklists (e.g., Euro+Med 2023) include the name *Scabiosa ucranica* into the synonymy of *S. argentea*, we decided to follow the taxonomic treatment used in Eastern European floras and checklists (Fedorov 1974; Czerepanov 1995; Mosyakin and Fedoronchuk 1999), where these taxa are not considered conspecific, based on morphological characters and ecology. However, for consistency, we accept the segregate genus *Lomelosia*, following the more recent taxonomic treatments of the *Dipsacaceae* family (e.g. Castroviejo et al. 1986–2021; Euro+Med 2023).

***Cynodonto dactyli-Teucrion polii* Korzhenevskii et Klyukin ex Korzhenevskii et Kvitnytskaya in Ryff 2018**

Name-giving taxa: *Cynodon dactylon* (L.) Pers. 1805, *Teucrium polium* L. 1753

Typus: *Cynodonto dactyli-Ajugetum chiaie* Korzhenevskii et Klyukin ex Korzhenevskii et Kvitnytskaya in Ryff 2018 (holotypus)

Synonym: *Cynodonto-Teucrion polii* Korzhenevskii et Klyukin 1990 (Art. 2a)

The alliance *Cynodonto-Teucrion polii* and association *Cynodonto dactyli-Ajugetum* were validated by Ryff (2018). The previous attempt by Korzhenevskii and Kvitnitskaya (2014) failed because they designated the nomenclatural type for the alliance without using the required Latin term ‘holotypus’ (Art. 5). Additionally, the association was deemed invalid because it was published without being explicitly indicated as new (Art. 3i). According to Mucina et al. (2016), the “*Melico chrysolepidis-Ephedrion distachyae* Umanets et V. Solomakha 1999” [recte: Umanets et I. Solomakha 1999] would be a valid syntaxonomic synonym. This syntaxon is also listed in the recently published “Prodrome of the vegetation of Ukraine” (Dubyna et al. 2019), but it is considered a syntaxonomic synonym of the alliance *Medicagini tenderiensis-Seselion tenderiensis* Umanets et I. Solomakha 1999. This last alliance is not included in the EuroVegChecklist (Mucina et al. 2016), and its syntaxonomic status remains unresolved, possibly requiring a comprehensive, European-scale revision of the class *Festuco-Brometea*. Therefore, we opt not to consider it until further clarification emerges.

***Cynodonto dactyli-Ajugetum chiaie* Korzhenevskii et Klyukin ex Korzhenevskii et Kvitnytskaya in Ryff 2018**

Name-giving taxa: *Cynodon dactylon* (L.) Pers. 1805, *Ajugha chamaepitys* subsp. *chia* (Schreb.) Arcang. 1882

Typus: Korzhenevskii and Kvitnitskaya (2014), table 3, relevé 5, p. 48 (holotypus)

Synonym: *Cynodonto-Ajugetum chiaie* Korzhenevskii et Klyukin 1990 (Art. 3i)

***Honckenyo peplidis-Leymetea arenarii* Tüxen 1966 mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Tüxen 1966: 366): “*Honckenyo-Elymetea arenariae* class. nova”

Name-giving taxa of the original syntaxon name: *Honckenya peploides* (L.) Ehrh. 1783, *Elymus arenarius* L. 1753
 Name-giving taxon of the mutated syntaxon name: *Honckenya peploides* (L.) Ehrh. 1783, *Leymus arenarius* (L.) Hochst. 1848

Authoritative taxonomic treatments that use the names *Honckenya peploides* and *Leymus arenarius*: Euro+Med PlantBase (2023), Hand and Thieme (2023)

Typus: *Honckenyo-Elymetalia arenarii* Tüxen 1966 (*holotypus*)

***Elymetalia arenarii* Braun-Blanquet et Tüxen 1952 mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Braun-Blanquet and Tüxen 1952): “*Elymetalia arenariae* Br.-Bl. et Tx. 1943”

Correct name: *Elymetalia arenarii* Braun-Blanquet et Tüxen 1952

Name-giving taxon of the original syntaxon name: *Elymus arenarius* L. 1753

Name-giving taxon of the mutated syntaxon name: *Leymus arenarius* (L.) Hochst. 1848

Authoritative taxonomic treatments that use the name *Leymus arenarius*: Euro+Med (2023), Hand and Thieme (2023)

Typus: *Agropyro-Minuartion peploidis* Tüxen in Braun-Blanquet et Tüxen 1952: 248 (*lectotypus hoc loco*)

Synonyms: *Honckenyo-Elymetalia arenarii* Tüxen 1966

The order *Elymetalia arenarii* was validly described by Braun-Blanquet and Tüxen (1952), and this name takes priority over the name *Honckenyo-Elymetalia arenarii* Tüxen 1966.

***Elytrigia boreoatlanticae-Honckenyon peploidis* Tüxen in Braun-Blanquet et Tüxen 1952 mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Braun-Blanquet and Tüxen 1952: 248): “*Agropyro-Minuartion peploidis* Tx. 1945 mskr.”

Correct name: *Agropyro boreoatlantici-Minuartion peploidis* Tüxen in Braun-Blanquet et Tüxen 1952

Name-giving taxa of the original syntaxon name: *Agropyron junceum* subsp. *boreoatlanticum* Simonet et Guin. 1938, *Minuartia peploides* (L.) Hiern 1899

Name-giving taxa of the mutated syntaxon name: *Elytrigia juncea* subsp. *boreoatlantica* (Simonet et Guin.) Hyl. 1953, *Honckenya peploides* (L.) Ehrh. 1783

Authoritative taxonomic treatments that use the names *Elytrigia juncea* subsp. *boreoatlantica* and *Honckenya peploides*: Tison et al. (2014), Euro+Med (2023)

Typus: *Euphorbio-Agropyretum juncei* Tüxen in Braun-Blanquet et Tüxen 1952 (*holotypus*)

***Euphorbio paraliae-Elytrigietum boreoatlanticae* Tüxen in Braun-Blanquet et Tüxen 1952 mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Braun-Blanquet and Tüxen 1952: 248): “*Euphorbio-Agropyretum juncei* Tx. 1945 mskr.”

Correct name: *Euphorbio paraliae-Agropyretum juncei* Tüxen in Braun-Blanquet et Tüxen 1952

Name-giving taxa of the original syntaxon name: *Euphorbia paralias* L. 1753, *Agropyron junceum* subsp. *boreoatlanticum* Simonet et Guin. 1938

Name-giving taxa of the mutated syntaxon name: *Euphorbia paralias* L. 1753, *Elytrigia juncea* subsp. *boreoatlantica* (Simonet et Guin.) Hyl. 1953

Authoritative taxonomic treatments that use the names *Euphorbia paralias* and *Elytrigia juncea* subsp. *boreoatlantica*: Tison et al. (2014), Euro+Med (2023)

Typus: Braun-Blanquet and Tüxen (1952), table 12, relevé no. 249 (*lectotypus hoc loco*)

In the original diagnosis of the *Euphorbio-Agropyretum juncei*, which contains relevés from Ireland, Braun-Blanquet and Tüxen (1952) used the taxon name “*Agropyron junceum* (Juslen.) P. B. ssp. *atlanticum* (Simonet)”. However, a subspecies with the epithet “*atlanticum*” does not exist. Both from the author citation of Simonet and from the relevé localities, it is obvious that they meant *Agropyron junceum* subsp. *boreoatlanticum* Simonet et Guin. We use this subspecies, combined in the genus *Elytrigia*, as a name-giving taxon of the mutated name of the association and its superior alliance.

***Leymion arenarii* Christiansen 1927 mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Christiansen 1927: 55): “*Elymion*”

Name-giving taxon of the original syntaxon name: *Elymus arenarius* L. 1753

Name-giving taxon of the mutated syntaxon name: *Leymus arenarius* (L.) Hochst. 1848

Authoritative taxonomic treatments that use the name *Leymus arenarius*: Euro+Med (2023), Hand and Thieme (2023)

Typus: *Festucetum rubrae* Christiansen 1927 (*holotypus*)

***Festucetum arenariae* Christiansen 1927 mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Christiansen 1927: 55): “*Festucetum rubrae*”

Name-giving taxon of the original syntaxon name: *Festuca rubra* L. 1753

Name-giving taxon of the mutated syntaxon name: *Festuca arenaria* Osbeck 1788

Authoritative taxonomic treatments that use the name *Festuca arenaria*: Hand and Thieme (2023), Euro+Med (2023)

Typus: Christiansen (1927), table 3 (*holotypus*)

The taxon name *Festuca rubra* used by Christiansen (1927) must be replaced with *F. arenaria*, a species ecologically linked to the North Atlantic coastal dunes stretching from France to Russia, encompassing the area where Christiansen (1927) sampled the relevés to describe this association.

***Mertensio maritimae-Honckenyon diffusae* Tüxen et Géhu in Géhu 1998**

Original form of the name (Géhu 1998): “*Mertensio maritimae-Honckenyon diffusae* (R. Tüxen et Géhu 1972) inéd.”

Name-giving taxa: *Mertensia maritima* (L.) Gray 1821, *Honckenya maritima* var. *diffusa* (\equiv *Honckenya peploides* subsp. *diffusa* (Hornem.) Hultén 1937)

Typus: *Honckenyo diffusae-Leymetum arenarii* Tüxen 1960 (*holotypus*)

***Koelerio glaucae-Corynephoretea canescentis* Klika in Klika et Novák 1941**

Original form of the name (Klika and Novák 1941): “*Koelerio-Corynephoretales*”

Name-giving taxa: *Koeleria glauca* (Schrad.) DC. 1813; *Corynephorus canescens* (L.) P. Beauv. 1812

Typus: *Corynephoretalia* Klika 1934 (*lectotypus* selected by Moravec 1967)

***Artemisio crithmifoliae-Koelerietalia albescentis* Sissingh 1974 nom. corr.**

Original form of the name (Sissingh 1974: 103): “*Artemisio-Koelerietalia albescentis* ordo novo”

Name-giving taxa of the original syntaxon name: *Artemisia lloydii* Rouy 1903, *Koeleria albescens* DC. 1813

Name-giving taxa of the corrected syntaxon name: *Artemisia crithmifolia* L. 1753, *Koeleria albescens* DC. 1813

Typus: *Euphorbio portlandicae-Helichrysion stoechadis* Géhu et Tüxen ex Sissingh 1974 (*lectotypus* selected by Dengler et al. 2003)

The correct name for “*Artemisia lloydii*” at the species level is *Artemisia crithmifolia* L. In Flora Iberica (Castroviejo et al. 1986–2021), *A. crithmifolia* L. is accepted as a species, while in other taxonomic works, it is included in *A. campestris* subsp. *maritima* (DC.) Arcang. 1882 (Euro+Med 2023). However, a mutation of the name to “*Artemisio maritimae-Koelerietalia albescentis*” would be a source of confusion as there is also the accepted species name *A. maritima* L. 1753.

***Euphorbio portlandicae-Helichrysion stoechadis* Géhu et Tüxen ex Sissingh 1974**

Original form of the name (Sissingh 1974: 103): “*Euphorbio-Helichrysion stoechadis* (Géhu et Tüxen 1972 n.n.) Sissingh”

Name-giving taxa: *Euphorbia portlandica* L. 1753, *Helichrysium stoechas* (L.) Moench 1794

Typus: *Artemisio lloydii-Ephedretum* Géhu et Sissingh in Sissingh 1974 (*lectotypus* selected by Rivas-Martínez 2011)

***Artemisio crithmifoliae-Ephedretum distachyae* Géhu et Sissingh in Sissingh 1974 nom. corr.**

Original form of the name (Sissingh 1974: 101): “*Artemisio lloydii-Ephedretum* Géhu et Sissingh ass. nov.”

Name-giving taxa of the original syntaxon name: *Artemisia lloydii* Rouy 1903, *Ephedra distachya* L. 1753

Name-giving taxa of the corrected syntaxon name: *Artemisia crithmifolia* L. 1753, *Ephedra distachya* L. 1753

Typus: Vanden Berghen (1963), table 1, relevé 1 (*lectotypus hoc loco*)

The correct name for “*Artemisia lloydii*” at the species level is *Artemisia crithmifolia* L. In Flora Iberica (Castroviejo et al. 1986–2021), *A. crithmifolia* L. is accepted as

a species, while in other taxonomic works, it is included in *A. campestris* subsp. *maritima* (DC.) Arcang. 1882 (Euro+Med 2023). However, a mutation of the name to “*Artemisio maritimae-Ephedretum distachyae*” would be a source of confusion as there is also the accepted species name *A. maritima* L. 1753.

***Koelerion arenariae* Tüxen 1937 mut. Gutermann et Mucina 1993**

Original form of the name (Tüxen 1937): “*Koelerion albescentis*”

Name-giving taxon of the original syntaxon name: *Koeleria albescens* DC. 1813

Name-giving taxon of the mutated syntaxon name: *Koeleria arenaria* (Dumort.) Conert 1987

Typus: *Tortulo-Phleetum* Braun-Blanquet et De Leeuw ex Tüxen 1937 nom. illeg. (Art. 31) (*holotypus*)

The association *Tortulo-Phleetum* was validly published by Braun-Blanquet and De Leeuw (1936). However, since there is no sufficient bibliographical reference to this work in Tüxen (1937), the type of the alliance must be considered as a later homonym.

According to Gutermann and Mucina (1993), the taxon name *Koeleria albescens* DC. used by Tüxen (1937) must be corrected to *K. arenaria* (Dumort.) Conert. *Koeleria albescens* occurs exclusively on the Atlantic coastal dunes of France and Spain, whereas *K. arenaria* has a wide range including the coastal areas of the Netherlands and Germany, where the relevés were sampled by Braun-Blanquet and De Leeuw (1936) and Tüxen (1937), respectively. Furthermore, according to the ICPN, the change of the alliance name proposed by Gutermann and Mucina (1993) is considered a mutation rather than a correction. This is because knowledge of the *Koeleria* species only came about after the description of this alliance.

***Syntrichio ruraliformis-Phleetum arenarii* Braun-Blanquet et De Leeuw 1936 mut. Marcenò et al. nom. mut. nov.**

Original form of the name (Braun-Blanquet and De Leeuw 1936: 366): “*Tortula ruraliformis-Phleum arenarium-Assoziation*”

Name-giving taxa of the original syntaxon name: *Tortula ruraliformis* (Besch.) W. Ingham 1903, *Phleum arenarium* L. 1753

Name-giving taxa of the mutated syntaxon name: *Syntrichia ruraliformis* (Besch.) Mans 1904, *Phleum arenarium* L. 1753

Authoritative taxonomic treatments that use the name *Syntrichia ruraliformis*: Hedenäs et al. (2019), Hodgetts et al. (2020)

Typus: Braun-Blanquet and De Leeuw (1936), table 1, relevé A (*lectotypus hoc loco*)

***Syntrichio ruraliformis-Lomelosion argenteae* Biondi, Sburlino et Theurillat in Sburlino et al. 2013**

Name-giving taxa: *Syntrichia ruraliformis* (Besch.) Mans, *Lomelosia argentea* (L.) Greuter et Burdet 1985

Typus: *Tortulo-Scabiosetum* Pignatti 1952 (*holotypus*)

Syntrichio ruraliformis-Lomelosietum argenteae* Pignatti 1952 *mut. Marcenò et al. nom. mut. nov.

Original form of the name (Pignatti 1952: 327): “*Tortulato-Scabiosetum* Pign. 1952”

Name-giving taxa of the original syntaxon name: *Tortula ruralis* subsp. *ruraliformis* (Besch.) T. Barker 1900, *Scabiosa argentea* L. 1753 var. *alba*

Name-giving taxa of the mutated syntaxon name: *Syntrichia ruraliformis* (Besch.) Mans 1904, *Lomelosia argentea* (L.) Greuter et Burdet 1985

Authoritative taxonomic treatments that use the name *Syntrichia ruraliformis*: Hedenäs et al. (2019), Hodgetts et al. (2020)

Authoritative taxonomic treatments that use the name *Lomelosia argentea*: Euro+Med (2023), Pignatti et al. (2017–2019)

Typus: Pignatti (1959), table 5, relevé 141 (*neotypus* designated by Sburlino et al. 2013).

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Author contributions

CM and MC planned the research, JD reviewed taxonomic and nomenclature treatment, CM, MC and WW wrote the manuscript, and all authors critically revised syntaxonomic and nomenclatural treatment.

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Appendix 1. Proposals (37, 38) to conserve the names *Ammophilion arundinaceae* Braun-Blanquet 1933 and *Medicagini marinae-Ammophiletum arundinaceae* Braun-Blanquet 1933

(37) *Ammophilion arundinaceae* Braun-Blanquet 1933
nom. superfl., nom. cons. propos.

Typus = typus of the *Ammophilion arenariae* Braun-Blanquet 1921 (Art. 18b)

(≡) *Ammophilion arenariae* Braun-Blanquet 1921

Typus: *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921 *nom. invers. (holotypus)*

The alliance “*Ammophilion*” was validly published by Braun-Blanquet (1921: 347), with *Ammophila arenaria* (L.) Link 1827 as the name-giving taxon. The only association in the original diagnosis is the “*Ammophila-Medicago marina*-Assoziation” [recte: *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921 *nom. invers.*] (Braun-Blanquet 1921: 343). This association is the holotype of the alliance name. The meaning of the epithet “*littori-arenariae*” used by Braun-Blanquet in one of the two variants of the name in the original diagnosis is unclear. However, we consider this as an alternative name that has no nomenclatural relevance. Since the only *Ammophila* species mentioned in the original diagnosis is *A. arenaria*, the correct name of the alliance is *Ammophilion arenariae*.

In 1933, Braun-Blanquet changed the name of the type association to “Ass. á *Ammophila arundinacea* et *Medicago marina* Br.-Bl. (1921) 1933” (Braun-Blanquet 1933: 8), and used the taxon name *Ammophila arenaria* subsp. *arundinacea* in synoptic tables. This could be interpreted as a “correction” corresponding to a mutation according to Art. 45 §8 (the § character refers here to non-numbered paragraphs within the article). However, since Braun-Blanquet (1933) did not provide an unambiguous reference to Braun-Blanquet (1921), the mutation is invalid, and the association name must be considered as an independently published, yet superfluous name based on the same (and some additional) relevés. In the same way, the name of the alliance is a new superfluous name in 1933, which is automatically typified by the type of the earlier name (Art. 18b). The corroboration that both Braun-Blanquet’s names validly published in 1933 must be considered superfluous is provided by Braun-Blanquet’s (1933: 1) announcement of the future publication of the fascicles of *Bibliographia Phytosociologica* complementing the *Prodromus*. Fascicle 3, published in 1936 (Braun-Blanquet and Diemont 1936) provides an unambiguous reference to Braun-Blanquet (1921).

The formal independence of the names published by Braun-Blanquet in 1921 and 1933 leads to the paradoxical situation that a mutation of the older name *Ammophilion arenariae* Braun-Blanquet 1921 is forbidden as it would form a homonym of a name validly published before the date of the mutation (Art. 45 §7). As a solution, we propose to conserve the later name *Ammophilion arundinaceae* Braun-Blanquet 1933 against the *Ammophilion arenariae* Braun-Blanquet 1921. The adoption of this proposal does not prevent a mutation of the alliance name back to *Ammophilion arenariae* if this would be desired, because validly published mutations of a conserved name are automatically conserved in the same way as the original name (Art. 45, Note 6).

The name *Ammophilion arundinaceae* was already used by Rivas-Martínez et al. (1980) as “*Ammophilion arundinaceae* Br.-Bl. 1933 em. J.M. Géhu, Rivas-Martínez et R. Tx. inéd.”.

(38) *Medicagini marinae-Ammophiletum arundinaceae* Braun-Blanquet 1933 *nom. superfl., nom. invers. et nom. cons. propos.*

Typus = typus of the *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921 (Art. 18b)

(≡) *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921 *nom. invers.*

Typus: Braun-Blanquet (1921), relevé no. 2: 344 (*lectotypus* selected by Fernández Prieto and Díaz González 1991)

The original diagnosis of *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921 *nom. invers.* contains the species name *Ammophila arenaria*. The relevés for this original diagnosis were sampled on the French Mediterranean coast, where this species is only represented by the subspecies *A. arenaria* subsp. *arundinacea* (Husn.) H. Lindb. according to various recent taxonomic treatments (Tison et al. 2014; Euro+Med 2023). The name of the association *Medicagini marinae-Ammophiletum arenariae* Braun-Blanquet 1921 was already corrected by Fernández Prieto and Díaz González (1991) using the infraspecific taxon name *A. arenaria* subsp. *australis* (Mabille) Laínz, which is a synonym of *A. arenaria* subsp. *arundinacea*. This correction was actually a mutation, but

because the authors used an incorrect subspecies name, the mutation failed (see Art. 45). A mutation using the correct name of the subspecies is blocked by the superfluous name *Medicagini marinae-Ammophiletum arundinaceae* Braun-Blanquet 1933 (see proposal 37 above). Therefore, we propose to conserve the name published in

1933, analogously to the alliance *Ammophilion arundinaceae* Braun-Blanquet 1933.

Both association names (the one from 1921 and the one from 1933) must be inverted because *Ammophila* has a higher cover in the type relevé than *Medicago marina* (3 versus 2) (Art. 42).

Appendix 2. Syntaxonomic framework of the syntaxa treated in this manuscript

Ammophiletea arundinaceae Braun-Blanquet et Tüxen ex Westhoff et al. 1946
Ammophiletalia arundinaceae Braun-Blanquet 1933
Ammophilion arundinaceae Braun-Blanquet 1933
nom. cons. propos.
Medicagini marinae-Ammophiletum arundinaceae Braun-Blanquet 1933 nom. invers. et cons. propos.
Crucianelletalia maritimae Sissingh 1974
Ononidion ramosissimae Pignatti 1953
Diantho attenuati-Scrophularion humifusae
Baudière et Simonneau 1974 nom. corr. et mut.
Marcenò et al. 2024
Diantho attenuati-Corynephorum canescentis
Baudière et Simonneau 1974 nom. corr.
Helichryso barrelieri-Centaureion spinosae Mucina et Dimopoulos in Mucina et al. 2016
Medicagini marinae-Centaureetum spinosae Géhu in Géhu et al. 1988 corr. Marcenò et al. 2024
Centaureo cuneifoliae-Verbascion pinnatifidi Brullo in Marcenò et al. 2018
Helichrysion picardii (Rivas-Martínez, Costa et Izco in Rivas-Martínez et al. 1990) Rivas-Martínez et al. 1999
Artemisio crithmifoliae-Armerietum pungentis
Rivas Goday and Rivas-Martínez 1958
Leymetalia racemosi Vicherek 1971 mut. Marcenò et al. 2024
Leymion racemosi Morariu 1957 mut. Marcenò et al. 2024
Leymetum racemosi Morariu 1957 mut. Marcenò et al. 2024
Sileno thymifoliae-Jurineion kilaeae Géhu et Uslu ex Mucina in Mucina et al. 2016
Lomelosion ucranicae Boscaiu 1975 mut. Marcenò et al. 2024
Cynodonto dactyli-Teucrion polii Korzhenevskii et Klyukin ex Korzhenevskii et Kvitnytskaya in Ryff 2018

Cynodonto dactyli-Ajugetum chiaae Korzhenevskii et Klyukin ex Korzhenevskii et Kvitnytskaya in Ryff 2018
Honckenyo peplidis-Leymetea arenarii Tüxen 1966 mut. Marcenò et al. 2024
Leymetalia arenarii Braun-Blanquet et Tüxen 1952 mut. Marcenò et al. 2024
Elytrigio boreoatlanticae-Honckenyon peplidis Tüxen in Braun-Blanquet et Tüxen 1952 mut. Marcenò et al. 2024
Euphorbio paraliae-Elytrigietum boreoatlanticae Tüxen in Braun-Blanquet et Tüxen 1952 mut. Marcenò et al. 2024
Leymion arenarii Christiansen 1927 mut. Marcenò et al. 2024
Festucetum arenariae Christiansen 1927 mut. Marcenò et al. 2024
Mertensio maritimae-Honckenyon diffusae Tüxen et Géhu in Géhu 1998
Koelerio glaucae-Corynephorum canescentis Klika in Klika et Novák 1941
Artemisio crithmifoliae-Koelerietalia albescentis Sissingh 1974 nom. corr.
Euphorbio portlandicae-Helichrysion stoechadis Géhu et Tüxen ex Sissingh 1974
Artemisio crithmifoliae-Ephedretum distachyae Géhu et Sissingh in Sissingh 1974 nom. corr.
Koelerion arenariae Tüxen 1937 mut. Gutermann et Mucina 1993
Syntrichio ruraliformis-Phleetum arenarii Braun-Blanquet et De Leeuw 1936 mut. Marcenò et al. 2024
Syntrichio ruraliformis-Lomelosion argenteae Biondi, Sburlino et Theurillat in Sburlino et al. 2013
Syntrichio ruraliformis-Lomelosietum argenteae Pignatti 1952 mut. Marcenò et al. 2024